

sure, to the difficulty of determining the species, in consequence of there being no complete list. It is hoped that the foregoing may in some degree supply this want, and lead to these animals being better known and understood.

EXPLANATION OF THE PLATES.

PLATE XII.

- Fig. 1. *Ammothoa brevipes*.
- Fig. 2. Ditto, footjaw.
- Fig. 3. Ditto, tarsus, &c.
- Fig. 4. Ditto, side view.
- Fig. 5. *Ammothoa longipes*.
- Fig. 6. Ditto, tarsus, &c.
- Fig. 7. *Achelia echinata*.
- Fig. 8. Ditto, side view.
- Fig. 9. Ditto, rostrum, palpi, and oculiferous tubercle.
- Fig. 10. Ditto, tip of false foot of female.

PLATE XIII.

- Fig. 11. *Achelia hispida*.
- Fig. 12. *Achelia lævis*.
- Fig. 13. *Phoxichilidium virescens*.
- Fig. 14. Ditto, footjaws.
- Fig. 15. Ditto, tarsus, &c.
- Fig. 16. *Pallene pygmæa*.
- Fig. 17. Ditto, tarsus, &c.

XIV.—On the Climbing Habits of *Anabas scandens*. By Capt. JESSE MITCHELL, of the Madras Government Central Museum.

THE following remarks on the *Anabas scandens* will be found at page 295, vol. iii., of the Rev. J. G. Wood's 'Illustrated Natural History,' published by Messrs. Routledge & Co. last year:—

"Some writers say this fish is capable of climbing palm-trees in search of the water that lodges between the bases of the dead leaves and the stem; but this account is now held unworthy of belief."

My object in writing this paper is to show that this account is not unworthy of belief, and that, however strange and unnatural it may appear, the *Anabas scandens* does in reality ascend palm-trees; but I am not prepared to say that it goes in search of water. Yet who knows? The fish may be enough of an epicure to prefer the pure rain-water to the muddy water found in the pools and streams after heavy monsoon rain; for it is at such times it is said to take this wonderful journey. But to my evidence.

A short time ago I was putting up a few freshwater fish to be

sent to Dr. Günther, of the British Museum, and among them were some specimens of *Anabas scandens*. I had directed my assistant, Mr. Rungasawmy Moodeliar, to prepare a list, giving only the Tamil names of the fish, and leaving a column for remarks. On examining this list, I observed opposite to 'Panai yéri' (the *A. scandens*) the entry—"This fish climbs palm-trees." On inquiring whence he had obtained this information, he replied that he had himself seen the fish ascend the palm-tree, and he described what he had witnessed. I asked him to put his statement in writing, and (with a few verbal alterations, not touching the facts) the following is his account:—

"This fish inhabits tanks or pools of water, and is called Panai yéri, *i. e.* the fish that climbs Palmyra-trees.

"Where there are Palmyra-trees growing by the side of a tank or pool, when heavy rain falls and the water runs profusely down their trunks, this fish, by means of its opercula, which move unlike those of other fish, crawls up the tree sideways to a height of from 5 to 7 feet, and then drops down.

"Should this fish be thrown upon the ground, it runs or proceeds rapidly along in the same manner (sideways), so long as the mucus on it remains."

By "sideways" my informant means that the fish, when climbing or moving on the ground, inclines the body considerably from the vertical; and this seems necessary to enable it to use the spines on the operculum to the best advantage.

I would here remark that the operculum of *Anabas scandens* has greater mobility than that of any fish that I can remember; and this was noticed by Cuvier (*Histoire Naturelle des Poissons*, tome vii. p. 249 of the 4to edition). It can be raised or turned outwards to nearly a right angle with the body; and when it is in that position, the suboperculum descends a little; and it appears to me that it is chiefly by the spines of this latter piece that the fish takes a purchase on the tree or on the ground. I have ascertained by experiment that the mere closing of the operculum when the spines are in contact with any surface, even common glass, pulls an ordinary-sized fish forwards about half an inch; but it is probable that additional force is supplied by the caudal and anal fins, both of which it is said are put in use when climbing or advancing on the ground: the motion, in fact, is described as a wriggling one.

One of my taxidermists has also informed me that in his boyish days he had frequently seen the Panai yéri ascend Palmyra-trees at Negapatam (now the terminus of the Southern India Railway). I should have said before, that Mr. Rungasawmy's observations were made about six years ago, in the neighbourhood of the Red Hills in the vicinity of Madras.

For myself, I am perfectly satisfied with the evidence, both verbal and written, that has been given to me. It will be seen that it is substantially the same as that given by Daldorff and John, who, however, did not notice (or, if they did, did not record) that the fish inclined its body to one side when advancing by means of its opercula. To me, the fact that the *negative* evidence of Buchanan Hamilton should have been considered of more value than the *positive* evidence of two eye-witnesses (one a highly respectable missionary, the other an officer in the Danish service) is a thing more extraordinary by far than that the *Anabas scandens* should ascend palm-trees, for which one might almost say it is specially fitted by the unusual form of its opercular pieces.

That Hamilton Buchanan never saw this fish climb a Palmyra-tree is by no means surprising; for it is said only to do so during the monsoon, when the trees are surrounded by water, and the rain is descending their trunks—a time when, save by the merest accident, no European, unless for some special reason, is likely to be in such a situation. Buchanan Hamilton was from Bengal, and in all probability knew nothing of the Tamil language; if he had, it might have occurred to him that the common Tamil name of this fish must have been given for some good reason.

Madras, Nov. 13, 1863.

XV.—*Observations on Raphides*. By GEORGE GULLIVER, F.R.S.

[Continued from p. 43.]

Rubiaceæ.—We have seen how, in our native Flora, the plants of this order may be characterized as raphis-bearers. Though Prof. Babington retains the name of *Rubiaceæ* in his 'Manual of British Botany,' these weeds have been separated by very high authority (see Lindley's 'Vegetable Kingdom') from the useful and larger group of *Cinchonaceæ*; so that Prof. Lindley's order *Galiaceæ* includes all the British species of *Rubiaceæ*, and he abolishes this last name altogether. Of *Cinchonaceæ* I am now enabled, through the courtesy of Dr. Hooker, to give the following results of a few examinations:—*Ixora* (fresh leaves of four species), no raphides; but abounding in beautiful sphæraphides, each about $\frac{1}{16000}$ th of an inch in diameter. *Gardenia* (fresh leaves of two species), no raphides; but loaded and somewhat gritty with sphæraphides, larger than those of *Ixora*, and well seen in sections of the petioles. *Manettia bicolor* and *Pentas carnea* (fresh leaves and interpetiolar stipules) abounding in